N89-16689

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
RESEARCH AND TECHNOLOGY RESUME

TITLE

PLANETARY OPTICAL AND INFRARED IMAGING

PERFORMING ORGANIZATION

JET PROPULSION LABORATORY
4800 OAK GROVE DRIVE
PASADENA, CA 91109

INVESTIGATOR'S NAME	TEL. NO.
TERRILE, R. J.	(818) 354-6158

DESCRIPTION *(a. Brief statement on strategy of investigation; b. Progress and accomplishments of prior year, c. What will be accomplished this year, as well as how and why; and d. Summary bibliography)*

A. OBJECTIVES: The purpose of this investigation is to obtain and analyze high spatial resolution CCD coronagraphic images of extra-solar planetary material and solar system objects. These data will provide information on the distribution of planetary and proto-planetary material around nearby stars leading to a better understanding of the origin and evolution of the solar system. Imaging within our solar system will provide information on the current cloud configurations on the outer planets, search for new objects around the outer planets, and provide direct support for Voyager, Galileo, and CRAF by imaging material around asteroids and clouds on Neptune.

B. ACCOMPLISHMENTS: Over the last year this program acquired multispectral and polarization images of the disk of material around the nearby star Beta Pictoris. This material is believed to be associated with the formation of planets and provides a first look at a planetary system much younger than our own. Preliminary color and polarization data suggest that the material is very low albedo and similar to dark outer solar system carbon rich material. A coronagraphic search for other systems is underway and has already examined over 100 nearby stars. Coronagraphic imaging provided the first clear look at the rings of Uranus and albedo limits for the ring arcs around Neptune.

C. PROPOSED RESEARCH: A survey of the nearby stars will be continued and data will be examined more deeply to provide limits on the probability of circumstellar material around stars and to understand the morphology of young planetary systems. Further imaging of the Beta Pictoris system is planned to obtain polarization data as a function of color. These data will allow a measurement of the particle size distribution of dust in the disk. Coronagraphic imaging of the outer planets, asteroids and star forming regions will continue to provide support for ongoing missions such as Voyager, Galileo, CRAF, Cassini and CIT.

D. SUMMARY BIBLIOGRAPHY: 4 abstracts published. Smith, B. A. and Terrile, R. J. (1987) "The Beta Pictoris Disk: Recent Optical Observations." Bull. Amer. Astron. Soc., 19, 829; Baines, K. H., Bergstralh, J. T., Orton, G. S., Terrile, R. J., Sepikas, J. and West, A. (1987) "Stratospheric Aerosols in the Great Red Spot and the South Polar Region On Jupiter." Bull. Amer. Astron. Soc., 19, 827.